

What is claimed is:

1. A process for recovering pentafluoroethane (HFC-125) comprising the steps of:

(a) providing a first mixture comprising pentafluoroethane (HFC-125) and chloropentafluoroethane (CFC-115); and

(b) distilling said first mixture in the presence of hexafluoropropene (HFP) to separate pentafluoroethane (HFC-125) from a second mixture comprising hexafluoropropene (HFP) and chloropentafluoroethane (CFC-115).

2. The process according to claim 1 wherein said distilling step comprises extractive distillation.

3. The process according to claim 1 wherein said hexafluoropropene (HFP) is an extracting agent.

4. The process according to claim 1 further comprising the steps of:

(c) recovering said pentafluoroethane (HFC-125) as an overhead product; and

(d) recovering said second mixture as a bottom product.

5. The process according to claim 1 further comprising the step of:

(e) purifying said hexafluoropropene (HFP) in said second mixture to produce a third mixture comprising said chloropentafluoroethane (CFC-115).

6. The process according to claim 5 further comprising the step of:

(f) recovering said hexafluoropropene (HFP).

7. The process according to claim 6 further including the step of converting hexafluoropropene (HFP) to at least one hexafluoropropene (HFP) derivative.

8. The process according to claim 6 further including the step of converting hexafluoropropene (HFP) to at least one fluoropolymer.

9. The process according to claim 6 further including the step of recycling said hexafluoropropene (HFP) to a process for recovering pentafluoroethane (HFC-125).

10. The process according to claim 1 further comprising the steps of:

(g) adding hydrogen fluoride (HF) to said second mixture to produce a fourth mixture;

(h) converting said hexafluoropropene (HFP) in said fourth mixture by hydrofluorination in the presence of a suitable catalyst to heptafluoropropane (HFC-227) to produce a fifth mixture;

(i) separating said fifth mixture into said heptafluoropropane (HFC-227) and a sixth mixture comprising said chloropentafluoroethane (CFC-115); and

(j) recovering said heptafluoropropane (HFC-227).

11. The process according to claim 10 wherein said suitable catalyst contains activated carbon.

12. The process according to claim 6 further comprising the steps of:

(k) adding hydrogen fluoride (HF) to said hexafluoropropene (HFP);

(l) converting said hexafluoropropene (HFP) by hydrofluorination to heptafluoropropane (HFC-227) in the presence of a suitable catalyst to form a seventh mixture; and

(m) separating said seventh mixture into said heptafluoropropane (HFC-227) and hydrofluorination byproducts.

13. The process of claim 12 further including the step of

(n) recovering said heptafluoropropane (HFC-227).

14. A process for recovering pentafluoroethane (HFC-125) comprising the steps of:

(o) providing a first mixture comprising pentafluoroethane (HFC-125) and chloropentafluoroethane (CFC-115);

(p) distilling said first mixture in the presence of chlorotrifluoroethene (CFC-1113) to separate pentafluoroethane (HFC-

125) from an eighth mixture comprising chlorotrifluoroethene (CFC-1113) and chloropentafluoroethane (CFC-115);

(q) recovering said pentafluoroethane (HFC-125) as an overhead product; and

(r) recovering said eighth mixture as a bottom product.

15. The process according to claim 14 wherein said distilling step comprises extractive distillation.

16. The process according to claim 14 wherein said chlorotrifluoroethene (CFC-1113) is an extracting agent.

17. The process according to claim 14 further including the step of recycling said eighth mixture to a process for manufacturing pentafluoroethane (HFC-125).

18. The process according to claim 14 further including the steps of:

(s) adding hydrogen fluoride (HF) to said eighth mixture to produce a ninth mixture; and

(t) converting said chlorotrifluoroethene (CFC-1113) in said ninth mixture to at least one fluoroethane in the presence of a suitable catalyst to produce a tenth mixture.

19. The process according to claim 18 wherein said fluoroethane comprises 1-chloro-1, 2, 2, 2-tetrafluoroethane (HCFC-124).

20. The process according to claim 18 further including the step of separating said tenth mixture into said at least one fluoroethane mixture and an eleventh mixture comprising hydrofluorination byproducts.

21. The process according to claim 18 further including the step of recycling said tenth mixture to a process for recovering pentafluoroethane (HFC-125).

22. A process for producing halogenated hydrocarbons comprising the steps of:

(u) providing a mixture comprising a near-azeotrope having at least one halogenated hydrocarbon and at least one halocarbon;

(v) distilling said near-azeotropic mixture in the presence of an olefinic extracting agent to separate said at least one halogenated hydrocarbon from a remaining mixture comprising said olefinic extracting agent and said at least one halocarbon; and

(w) converting said olefinic extracting agent in said remaining mixture to a derivative compound.

23. The process for producing halogenated hydrocarbons according to claim 22 further comprising the step of recovering said at least one halogenated hydrocarbon.

24. The process according to claim 22 further including the step of purifying said derivative compound.

25. The process according to claim 22 wherein said at least one halogenated hydrocarbon is pentafluoroethane (HFC-125).

26. The process according to claim 22 wherein said near-azeotropic mixture comprises chloropentafluoroethane (CFC-115) and pentafluoroethane (HFC-125).

27. The process according to claim 22 wherein said olefinic extracting agent is hexafluoropropene (HFP).

28. The process according to claim 27 wherein said derivative compound is heptafluoropropane (HFC-227).

29. The process according to claim 22 wherein said olefinic extracting agent is chlorotrifluoroethene (CFC-1113).

30. The process according to claim 29 wherein said derivative compound is 1-chloro-1, 2, 2, 2-tetrafluoroethane (HCFC-124).

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